# Unit Plan: Design and Technologies

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| **Australian Curriculum**  Design and Technologies | **“Evaluating Equipment”** | | | | **Years 3 and 4** |
| **Design and Technologies Knowledge and Understanding**  Investigate the suitability of materials, systems, components, tools and equipment for a range of purposes (ACTDEK013) | | | **Design and Technologies Processes and Production Skills**  Evaluate design ideas, processes and solutions based on criteria for success developed with guidance and including care for the environment (ACTDEP017) | | |
| **Cross-curriculum Priorities**   * Sustainability | | | **General Capabilities**   * Critical and Creative thinking | | |
| **Key Ideas**  Design thinking | | | | | |
| **Overview**  This unit plan will teach students about suitable materials and use in products and technologies, as well as the sustainability of these products. Students learn about different materials and their features, making judgements about the appropriateness and sustainability.  Students then will use this knowledge to evaluate inventions and technologies, using a criterion that looks at many different elements. Students will then write an analysis of the product, suggesting changes so the product fits within the criterion.  In this unit, students will engage in critical analysis, applying their learnt knowledge through practical discussion and completing class activities. | | **Prior Knowledge**  Commencing this unit, it is important to assess the students’ prior knowledge, and ensure students have sufficient understanding to commence this unit.  Students should have basic knowledge about:   * Common building/production materials such as different types of plastics, metal, wood, glass, paper, fabric, etc. * Working independently with some teacher scaffolding and support.   If the students lack this knowledge, it should be taught before the commencement of the lesson. | | **Learning Outcomes**  By the end of this unit, students should be able to analyse and identify the effectiveness of the materials used in a variety of technologies.  Students will develop critical thinking and analysis skills, as well as linking these skills with practical and everyday situations.  Students will have a thorough knowledge of sustainability, sustainable practices, and how to be sustainable citizens. They will be able to transfer these skills to being the citizens of the future. | |
| **Formative Assessment Tasks**  Throughout this unit, formative assessment tasks will inform the teacher of the students’ understanding, informing the teacher of progress, and how to approach the next lesson, and whether additional teaching is required.   1. By the end of the first lesson, students should be able to independently identify features of, and materials commonly used in inventions and technologies by matching their names to their features. Students should also be able to recall basic facts about the materials’ strengths and weaknesses. 2. By the end of the second lesson, students should be able to match appropriate materials with machines, technologies, or inventions that they would be effective with, as well as identifying features and characteristics of machines, technologies, and inventions. 3. By the end of the third lesson, students should be able to evaluate inventions, based on their functional qualities, aesthetic qualities, sustainability, and waste. Students should also be able to simply theorise how a machine, invention, or technology can be improved, based on its features. | | | **Summative Assessment Piece**  The summative assessment piece is the final task to be completed by students, and will be marked and reported on.  This task is an extension on the activities completed in class, though this is completed individually.  Students will be given a basic invention with many obvious flaws. Students will evaluate it, using the same sheet used in class. The students will then circle elements that should be improved to benefit the invention. Students will be required to write notes about how each element can be improved, to adhere to the evaluation sheet (such as changing the material, removing unnecessary features, make the invention more sustainable by improving the quality). Students should then perform another evaluation, based on their changes.  Full and mostly correct completion of this task will achieve full marks (or an ‘A’).  A basic standard achievement would be demonstrated through completing the evaluation, and circling the features that can be altered or changed, with no further progression on how they could be changed, or any of the following steps. | | |
| **Pedagogical Approaches**  The lessons in this unit will predominantly consist of explicit teaching, and class discussion, with students sharing ideas, and teacher scaffolding and support when needed.  As the students achieve mastery, they will move towards independence.  As this unit involves complex information, breaking information into chunks, or basic tasks will help student engagement and understanding.  Linking the knowledge back to the real word will help students to engage with the tasks, especially when engaging with higher-order thinking skills. | | | **Differentiation**  Within all classrooms, a range of diverse learning needs exist. It is important to cater for these learning needs to give students the best possible chance at success.  While these learning needs greatly vary, and cannot be covered in a single generic unit plan, some ideas, activities, and strategies are listed to help support, and give basic ideas  For higher achieving students:   * After completing the tasks, the students can extend their thinking, to assessing and adding to the inventions, creating strengths and developing ideas. * Students could design other technologies to achieve the same purpose, and compare and evaluate theirs, compared to the initial invention.   For lower achieving students:   * Break up the tasks into singular learning experiences * Create a word wall with definitions with all the words and phrases used * Have information presented and displayed in a variety of ways, such as on an IWB, verbally, on printed handouts for students who want it, and using interactive activities. These strategies will help students to engage with the task, giving the student the most chance at succeeding * Altering the product and work that the student completes may help the student to present the correct information, in a more simple form * Being flexible in how the student completes the work would help the student to display their knowledge and understanding through an individual, unique method that suits the student’s needs. | | |
| **Resources**   * Interactive Whiteboard * Class set of evaluation sheet * Examples of a range of materials   + Glass   + Wood   + Cardboard   + Metal   + Plastic   + Fabric   + Paper * Pictures for a range of inventions and technologies, both effective and ineffective * Whiteboard and pens | | |
| **Lesson Overview**   1. Introduce students to the unit. Introduce students to the range of materials that could be used for inventions and technology. Brainstorm their features, strengths, and weaknesses. Teach students about sustainability and waste, and link in with each specific material. In their books, students match the sample or picture/name of the product with the features, but cutting and gluing from *activity sheet 1.* 2. Students are introduced to machines and inventions, and learn about important aspects, such as a motor/driving device, a purpose, how and when/where to use it, and the moving and stationary parts. Students connect the materials studied last lesson with the best possible technology or machine. 3. Students are introduced to the evaluation sheet for inventions, and connect their learning and knowledge about the materials and inventions to be critical analysers, and evaluate the inventions. Students then justify their analysis by specifically highlighting the weaknesses in the technology, and suggesting ways to make improvements. This is completed as a class, before extending onto individual, independent completion, in preparation for the summative assessment piece. | | | | | |